

**Better the devil you know: *Teucrium diabolicum* (Lamiaceae),
a new species from mining tenements in the Coolgardie bioregion**

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SHORT COMMUNICATION

Teucrium L. (Lamiaceae) is a species-rich genus with an almost cosmopolitan distribution and a centre of diversity in the western Mediterranean region (Harley *et al.* 2004; Salmaki *et al.* 2016). In Western Australia, fifteen species are currently recognised including six informally-named taxa (Western Australian Herbarium 1998–). A full taxonomic review of the genus in Western Australia is required; however, in accordance with the taxonomic strategy outlined by Wege *et al.* (2015), we herein formally recognise a new species restricted to areas of high mineral prospectivity, with a view to providing taxonomic certainty for conservation planning and diagnostic information to facilitate future surveys.

Teucrium diabolicum R.W.Davis & Wege, *sp. nov.*

Type: west of Norseman, Western Australia [precise locality withheld for conservation reasons], 9 March 2017, P. Armstrong PA 17/065 (*holo:* PERTH 09018840; *iso:* AD, CANB, K, M, MEL, NSW).

Teucrium sp. dwarf (R. Davis 8813), Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 3 April 2018].

Virgate, perennial *subshrub*, *c.* 10–20 cm high, suckering from a thick woody rootstock; young stems green, 4-angled, densely hairy especially between the ridges; hairs white, retrorse, unbranched or scarcely 2-branched, *c.* 0.1–0.3 mm long, underlain by sparse to dense, sessile, hemispherical glands. *Leaves* sessile, 1.5–5 mm long, 1.5–4.5 mm wide, deeply trilobed, with each segment entire or commonly with 1 or 2 lateral lobes, venation distinct; primary lobes 0.5–2.5 mm long, obtuse; margins revolute, not obscuring the abaxial surface; adaxial surface with sparse, antrorse hairs near the margins; abaxial surface with antrorse hairs mostly following the veins, with dense hemispherical glands elsewhere. *Flowers* solitary in the axils towards the ends of branches, pedicels 0.5–1.2(–3.5) mm long; prophylls 0.5–2 mm long, with antrorse hairs. *Calyx* campanulate; outer surface with sparse to moderately dense antrorse hairs underlain with dense to moderately dense hemispherical glands and sparse glandular hairs; inner surface with sparse glandular hairs restricted to the lobes; tube 1.2–2 mm long; lobes \pm equal, triangular, 1.8–3.3 mm long, 0.8–1.1 mm wide at base, acute, with a prominent midvein. *Corolla* white; tube *c.* 1.5 mm long, slightly split on posterior side; outer surface with sparse to moderately dense simple hairs on the distal portion of the tube and central portion of the lobes,

underlain with sparse to moderately dense hemispherical glands; inner surface with sparse simple hairs on the tube and sometimes toward the base of the anterior lobe, dense simple hairs at the base of the stamens, and usually sparse glandular hairs on the distal portion of the tube and the base of the lobes; anterior lobe ovate, 4–6 mm long, 2.3–3.7 mm wide; lateral and posterior lobe pairs slightly spatulate to elliptic, 2.3–3.7 mm long, 1.3–2.5 mm wide. *Stamens* unequal in length, posterior pair 3.8–8 mm long, anterior pair 6–10.8 mm long; filaments downwardly curved, with simple hairs toward the base; anthers 0.6–0.8 mm long. *Ovary* globose, scarcely 4-lobed, with simple hairs and hemispherical glands toward the apex; style exerted, filiform, curved like the filaments, 5.5–9 mm long, glabrous except for the occasional simple hair toward the base; stigma bifid, lobes 1–1.5 mm long. *Fruiting calyx* not enlarged. *Mericarps* obovoid, rounded on the outer face, angled between the inner faces, c. 1 mm long, with a dense indumentum of simple hairs and sparse hemispherical glands, attachment scar less than half the length of the mericarp. (Figure 1)

Diagnostic features. *Teucrium diabolicum* can be distinguished from all other Australian species by the following combination of characters: a virgate, suckering habit to c. 20 cm high; deeply trilobed leaves 1.5–5 mm long, with obtuse segments that often have 1 or 2 lateral lobes; retrorse hairs on the stems; calyces with sparse to moderately dense antrorse hairs underlain with dense to moderately dense hemispherical glands and sparse glandular hairs.

Selected specimens. WESTERN AUSTRALIA: [localities withheld for conservation reasons] 2 Nov. 2003, P.G. Armstrong PA 009 (PERTH); 9 May 2012, P.G. Armstrong PA 12/034 (PERTH); 18 July 2012, P.G. Armstrong PA 12/086 (PERTH); 10 Nov. 2016, P. Armstrong PA 16/702 (CANB, MEL, PERTH, NSW); 14 Apr. 1999, R. Davis 8813 (PERTH).

Phenology. Flowering has been recorded in both Autumn (March to early May) and spring (late October to mid-November) but could possibly occur at other times of the year depending on seasonal rains. Fruit have been collected from mid-April to mid-May.

Distribution and habitat. *Teucrium diabolicum* is known from a small number of locations in Western Australia's Coolgardie bioregion, mostly between Hyden and Norseman but with one record from near Southern Cross. It grows in red cracking clay or clay loam, usually in shallow depressions or on low undulating plains that support low scrub or heath, or in association with low open woodland (e.g. with *Eucalyptus tenuis*).

Conservation status. Listed by Smith and Jones (2018) as Priority Three under Conservation Codes for Western Australian Flora, under the name *T. sp. dwarf* (R. Davis 8813). This poorly known species is apparently restricted to mining leases. While large numbers of plants have been estimated at some sites (e.g. 10,000 dominating an area 10 × 50 m at P. Armstrong PA 16/702), we suspect that this is partially an artefact of its suckering habit; other species in the genus are known to form dense stands by suckering over a small area (Toelken 1985; Walsh & O'Brien 2013). Targeted survey is required to ascertain whether *T. diabolicum* warrants listing as Threatened: development impacts could be significant if the species has a small area of occupancy.

Etymology. The epithet is derived from the Greek (*diabolikos* – devilish); as per the title of this paper, this is a reference to the need for sound taxonomic knowledge to underpin decision-making and conservation planning in areas subject to development pressures.

Vernacular name. Devil's Germander.

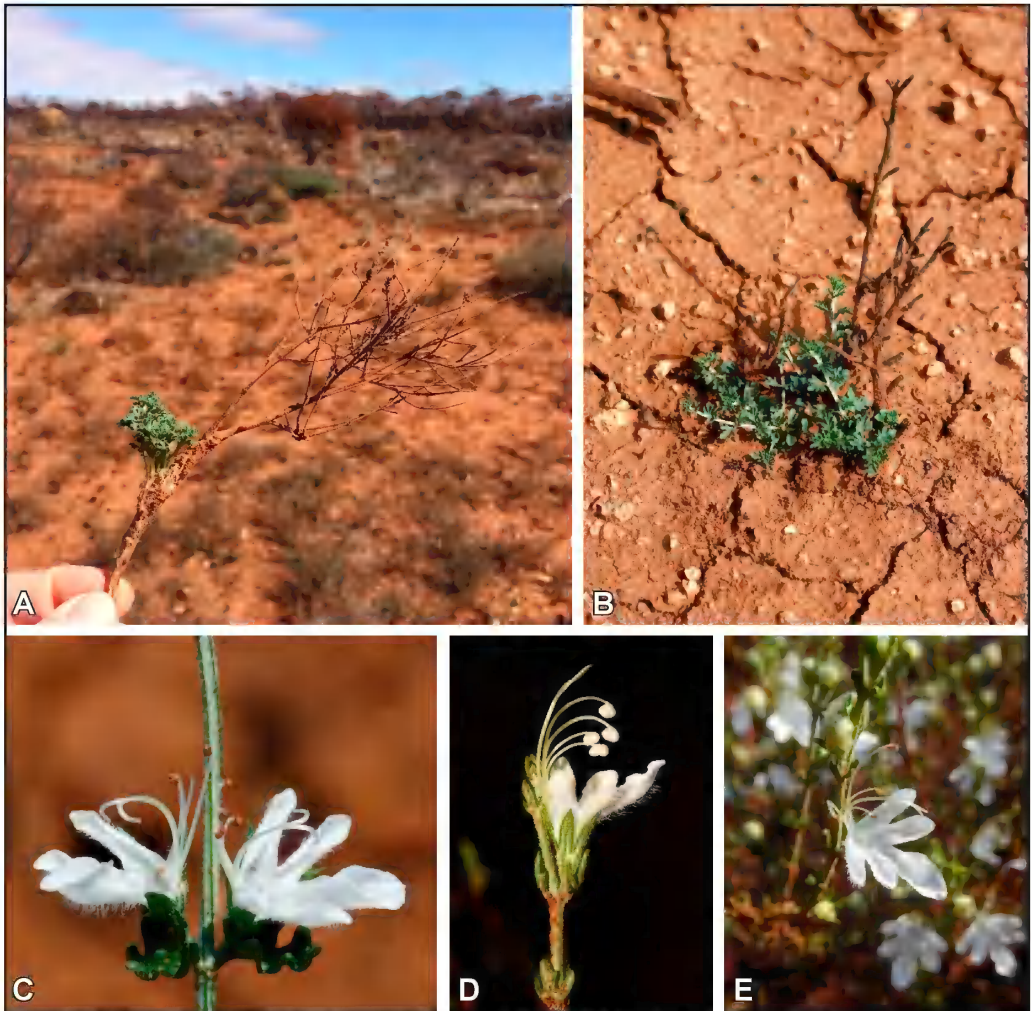


Figure 1. *Teucrium diabolicum*. A – a plant excised from a post-fire habitat showing dead above-ground stems and new growth from a thick, woody rootstock; B – resprouting plants *in situ* showing burnt stem remnants and cracking clay soils; C – flowers in the leaf axils. Note the bilobed stigmas and dense indumentum between the stem ridges; D – side view of flower showing the exerted and unequal stamens. Note the small, trilobed leaf at the bottom of the photo; E – flower showing the larger anterior corolla lobe and more or less equal lateral and posterior lobe pairs. Photographs © J. Wege (A–C, from *J.A. Wege & B.P. Miller JAW* 2059), R. Davis and P. Armstrong (D & E respectively, from *P. Armstrong PA* 17/065).

Affinities. *Teucrium diabolicum* is a distinctive species and we are uncertain as to its precise systematic affinities; it is best compared to other species with trilobed leaves in southern Western Australia, of which *T. sp. Balladonia* (K.R. Newbey 7380) is most likely to cause confusion on account of its similar habit, deeply lobed leaves and dense, appressed stem indumentum. The stem hairs in this species are, however, obviously branched, with the branches variously orientated rather than retrorse as in *T. diabolicum*. The indumentum on the outer surface of the calyces of these two species is similarly different, although here the hairs are antrorse in *T. diabolicum*; the calyx hairs in *T. sp. Balladonia* are more numerous, and more conspicuous at the margins of the lobes. There is also a readily observable difference in the inflorescences of the two species: in *T. diabolicum* the flowers are widely spaced on the branchlets whereas in *T. sp. Balladonia* they are closely spaced, forming a spike-like inflorescence. *Teucrium diabolicum* also tends to have a shorter calyx tube than *T. sp. Balladonia* (1.2–2 mm *cf.* 2–3 mm) and

longer calyx lobes (1.8–3.3 mm *cf.* 1.2–1.7 mm), and has a more westerly distribution than that of *T. sp. Balladonia* (Western Australian Herbarium 1998–).

Three other south-western species that can have trilobed leaves are *T. sessiliflorum* Benth., *T. fililobum* Benth. and *T. sp. Norseman* (T.E.H. Aplin 1851). *Teucrium sessiliflorum* is a widespread taxon with occurrences in the Coolgardie bioregion; *T. diabolicum* can be readily separated from Western Australian material of this species by its mostly shorter leaves (1.5–5 mm long *cf.* 5–35 mm) and its inflorescence (flowers in the axils of deeply lobed leaves that are widely spaced on the branchlets *cf.* spike-like inflorescences, with flowers in the axils of closely-spaced leaves that are usually entire or shallowly-lobed, particularly towards the tip of the inflorescence). The dense, retrorse stem hairs in *T. diabolicum* can also be used to distinguish it from *T. sessiliflorum*, which usually has sparse, simple and more or less patent stems hairs, although some collections have denser, variously branched and somewhat appressed hairs like those in *T. sp. Balladonia*. Note we have not examined south-eastern Australian material of *T. sessiliflorum* and are presently uncertain as to whether material from this region is referable to the typical Western Australian form or whether it aligns to *T. sp. Balladonia*, or indeed whether the latter entity will prove distinct from *T. sessiliflorum* under closer taxonomic scrutiny.

Both *T. fililobum* and *T. sp. Norseman* are readily differentiated from *T. diabolicum* by their patent, simple or glandular stem and leaf hairs (*cf.* retrorse hairs), and entire leaf segments with tightly revolute margins that obscure the undersurface (*cf.* mostly lobed leaf segments with revolute margins that do not obscure the undersurface). *Teucrium sp. Norseman* (T.E.H. Aplin 1851) has a similar distribution to that of *T. diabolicum* but appears to grow in more upland habitats (e.g. on hillslopes) rather than favouring depressions. *Teucrium fililobum* has a distribution that is centred on the Avon Wheatbelt and Mallee bioregions although there are two records of *T. fililobum* subsp. glandular (W. Rogerson 233) from the Coolgardie region between Lake King and Norseman.

Notes. In early April 2018, individuals of *T. diabolicum* were observed resprouting from their woody rootstocks following a January wildfire and subsequent summer rainfall (*J.A. Wege & B.P. Miller* JAW 2059 (PERTH); Figure 1A, B). The leaves of the new growth were slightly larger than those found on mature plants (to 10 × 7 mm), and had additional lobing. No seedlings were observed at this time.

The northern-most collection of *T. diabolicum* from near Southern Cross (*J. Warden & D. Leach* 38454; PERTH) is atypical in having flowers on pedicels 2–3.5 mm long.

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